

WHAT IS CLAIMED IS:

1. A buckle device comprising:

a device main body into which is inserted a tongue plate provided at a webbing belt;

a locking mechanism having a latch which is provided within the device main body so as to be movable between an engagement position, at which the latch engages with the tongue plate which has been inserted in the device main body, and an engagement released position, at which the latch does not engage with the tongue plate, wherein when the latch moves to the engagement position, the latch engages with the tongue plate and restricts pulling-out of the tongue plate from the device main body;

a first detecting mechanism detecting the tongue plate which has been inserted in the device main body, and outputting a first detection signal in a state in which the first detecting mechanism detects at least the tongue plate;

a second detecting mechanism selected from one of directly or indirectly detecting the latch which is positioned at either one of the engagement position and the engagement released position, and outputting a second detection signal in a state in which the second detecting mechanism detects at least the latch; and

a judging mechanism connected to the first detecting mechanism, and, on the basis of the first detection signal from

the first detecting mechanism, judging whether or not the tongue plate has been inserted in the device main body, and connected to the second detecting mechanism, and, on the basis of the second detection signal from the second detecting mechanism, judging whether the latch is positioned at the engagement position or the engagement released position.

2. The buckle device of claim 1, wherein the locking mechanism has a restricting member, and the restricting member is provided at an interior of the device main body so as to be interlockingly movable with the latch so as to move from an abutment canceled position, at which the restricting member does not abut the latch, to an abutment position, at which the restricting member abuts the latch, when the latch moves from the engagement released position to the engagement position, and in a state in which the restricting member has moved to the abutment position, the restricting member abuts the latch which has moved to the engagement position, and restricts movement of the latch to the engagement released position.

3. The buckle device of claim 2, wherein the second detecting mechanism has a restricting member detecting mechanism which detects the restricting member positioned at either one of the abutment canceled position and the abutment position, and which outputs a predetermined detection signal in a state in which the

restricting member detecting mechanism detects at least the restricting member.

4. The buckle device of claim 1, wherein the first detecting mechanism has:

a permanent magnet provided at a side of a locus of movement of the tongue plate within the device main body, an orientation of magnetic poles of the permanent magnet running along a direction of movement of the tongue plate within the device main body; and

a magnetic sensor detecting magnetism of the permanent magnet, and outputting the first detection signal on the basis of changes in detected magnetism.

5. The buckle device of claim 4, wherein the tongue plate is formed by a magnetic body, and the first detecting mechanism is disposed at a side of the tongue plate which is inserted in the device main body.

6. The buckle device of claim 4, wherein the magnetic sensor structuring the first detecting mechanism is formed by a magnetoresistive element.

7. The buckle device of claim 6, wherein the magnetoresistive element is a giant magnetoresistive element.

8. The buckle device of claim 4, wherein the second detecting mechanism includes:

a permanent magnet provided within the device main body, and moving one of integrally with and interlockingly with movement of the latch; and

a magnetic sensor provided at a side of the permanent magnet in a state in which the latch is positioned at one of the engagement position and the engagement released position, the magnetic sensor detecting magnetism of the permanent magnet and outputting the second detection signal which is based on changes in detected magnetism.

9. The buckle device of claim 8, wherein the magnetic sensor structuring the second detecting mechanism is formed by a magnetoresistive element.

10. The buckle device of claim 9, wherein the magnetoresistive element is a giant magnetoresistive element.

11. The buckle device of claim 1, further comprising a substrate to which both the first detecting mechanism and the second detecting mechanism are mounted.

12. The buckle device of claim 11, wherein electrical current

is always made to flow to electrical circuits including the first detecting mechanism and the second detecting mechanism.

13. A buckle device comprising:

a device main body into which is inserted a tongue plate provided at a webbing belt;

a locking mechanism having a latch which is provided within the device main body so as to be movable to a position at which the latch can engage with the tongue plate when the tongue plate is inserted in the device main body, the locking mechanism restricting pulling-out of the tongue plate from the device main body;

a first detecting mechanism detecting the tongue plate which has been inserted in the device main body, and outputting a first detection signal;

a second detecting mechanism detecting a position of the latch, and outputting a second detection signal; and

a judging mechanism connected to the first detecting mechanism and the second detecting mechanism,

wherein on the basis of the first detection signal, the judging mechanism judges whether or not the tongue plate is inserted in the device main body, and on the basis of the second detection signal, the judging mechanism judges whether or not the latch is engaged with the tongue plate.

14. The buckle device of claim 13, wherein the first detecting mechanism includes:

a magnet provided at a side of a locus of movement of the tongue plate within the device main body, an orientation of magnetic poles of the magnet running along a direction of movement of the tongue plate within the device main body; and

a magnetic sensor detecting magnetism of the magnet, and outputting the first detection signal on the basis of changes in detected magnetism.

15. The buckle device of claim 14, wherein the first detecting mechanism is disposed at a side of the tongue plate which is inserted in the device main body.

16. The buckle device of claim 14, wherein the magnetic sensor structuring the first detecting mechanism is formed by a magnetoresistive element.

17. The buckle device of claim 14, wherein the second detecting mechanism includes:

a magnet provided within the device main body, and moving either integrally with or interlockingly with movement of the latch; and

a magnetic sensor provided at a side of the magnet in a state in which the latch is positioned at a position of engaging with

the tongue plate, the magnetic sensor detecting magnetism of the magnet and outputting the second detection signal which is based on changes in detected magnetism.

18. The buckle device of claim 17, wherein the magnetic sensor structuring the second detecting mechanism is formed by a magnetoresistive element.

19. A method of judging whether or not the tongue plate is attached to the buckle device in the buckle device of claim 17, said method comprising:

judging a high/low level of an electrical current value of each first detection signal outputted on the basis of a state of the tongue plate;

judging a high/low level of an electrical current value of each second detection signal outputted on the basis of a state of the latch when each first detection signal is outputted; and

outputting a judgment signal from the judging mechanism on the basis of results of judgment of each first detection signal and each second detection signal corresponding to each first detection signal.

20. The method of judging of claim 19, wherein the judging mechanism judges that the tongue plate is reliably attached to the buckle device when each first detection signal and each second

detection signal both have high electrical current values.